

Amendments to the Claims:

This listing of claims will replace all prior listings of claims in the application:

Listing of Claims:

1. (Currently amended) A pharmaceutical composition for reducing oxidative damage or delaying senescence comprising an orally administrable effective unit dosage of a primary N-hydroxylamine or a pharmaceutically acceptable salt thereof and substantially free of a nitronone corresponding to the hydroxylamine, wherein the hydroxylamine has the general formula,



wherein R₁, R₂ and R₃ are independently selected from: hydrogen, substituted or unsubstituted (C1-C10C18) alkyl, alkenyl, alkynyl, aryl, oxyl, acyl, carboxyl, amino, nitro, nitroso, oxime, hydrazone, azo, thiol, sulfonyl and halide.

2. (Original) A composition according to claim 1, wherein the dosage is from 100 ug to 1g.

3. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is selected from unsubstituted (C1-C10C18) alkyl, alkenyl and alkynyl.

4. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is selected from unsubstituted (C1-C18) alkyl, cycloalkyl, alkenyl and alkynyl, and the R said at least one of R₁, R₂ and R₃ is selected from: CH₃-(CH₂)_{n1}, (CH₃-(CH₂)_{n2})₂ CH, (CH₃-(CH₂)_{n2})₃, cyclopentyl, cyclohexyl, (CH₂=CH-CH₂)_{n3} and (CH≡C-CH₂)_{n3}, wherein n1 = 1 to 18, n2 = 1 to 17 and n3 = 1 to 3.

5. (Currently amended) A composition according to claim 1, wherein ~~at least one of R₁, R₂ and R₃ is selected from hydrogen, unsubstituted (C1-C10) alkyl, alkenyl and alkynyl, and the~~ hydroxylamine is selected from:

N-methylhydroxylamine,	N-(n-decahexyl)hydroxylamine,
N-ethylhydroxylamine,	N-(n-decaoctyl)hydroxylamine,
N-n-propylhydroxylamine,	N-isopropylhydroxylamine,
N-(n-butyl) hydroxylamine,	N-sec-butylhydroxylamine,
N-(n-pentyl)hydroxylamine,	N-tert-butylhydroxylamine,
N-(n-hexyl)hydroxylamine,	N-cyclohexylhydroxylamine,
N-(n-heptyl)hydroxylamine,	N-cyclopentylhydroxylamine,
N-(n-octyl)hydroxylamine,	N-(2-propene)hydroxylamine,
N-(n-nonyl)hydroxylamine,	N-(3-butene)hydroxylamine,
N-(n-decyl)hydroxylamine,	N-(2-propyne)hydroxylamine and
N-(n-dodecyl)hydroxylamine,	N-(3-butyne)hydroxylamine.

6. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted aryl.

7. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted aryl, and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from: mono, di, or tri methyl, methoxy, halo, nitro, amino, hydroxyl and substituted or unsubstituted phenyl, naphthyl, anthryl, phenanthryl, pyridyl, quinolinyl, imidazolyl, benzoxazolyl, pyrrolyl, furanyl, piperidinolyl and tetrahydrofuranyl.

8. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted aryl,~~ and the hydroxylamine is selected from:

N-benzylhydroxylamine,	N-(1,3-diaminobenzyl)hydroxylamine,
N-(n-nitrobenzyl)hydroxylamine,	N-(1,3-hydroxybenzyl)hydroxylamine,
N-(n-methylbenzyl)hydroxylamine,	N-(2,4-diaminobenzyl)hydroxylamine,
N-(n-chlorobenzyl)hydroxylamine,	N-(2,4-dihydroxybenzyl)hydroxylamine,
N-(n-aminobenzyl)hydroxylamine,	Imidazole-2-methylhydroxylamine and

N-(n-hydroxybenzyl)hydroxylamine, Benzoxazole-2-methylhydroxylamine,
wherein n is selected from 1, 2, 3, 4, 5 and 6.

9. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) oxyl.

10. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) oxyl and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from: hydroxyl, hydroxyalkyl (HO-(CH₂)_{n1}), hydroxyaryl selected from benzylalcohol, phenol and naphthol, alkoxy (O-(CH₂)_{n1}) and aryloxy selected from phenoxy, benzyloxy and naphthyloxy, wherein n1= 1 to 18.

11. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) alkyl hydroxyl or aryl hydroxyl~~ and the hydroxylamine is selected from:

N-(hydroxymethyl)hydroxylamine,	N-(methoxymethyl)hydroxylamine,
N-(2-hydroxyethyl)hydroxylamine,	N-(methoxyethyl)hydroxylamine,
N-(3-hydroxypropyl)hydroxylamine,	N-(methoxyisopropyl)hydroxylamine,
N-(4-hydroxybutyl)hydroxylamine,	N-(benzyloxymethyl)hydroxylamine and
N-(6-hydroxyhexyl)hydroxylamine,	N-(4-hydroxymethylbenzyl)hydroxylamine.
N-(12-hydroxydodecyl)hydroxylamine,	

12. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) alkylcarboxyl or arylcarboxyl.

13. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) alkyl or aryl carboxyl and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from carboxyalkyls and benzyl.

14. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl (C1-C18) or arylcarboxyl~~ and the hydroxylamine is selected from:

N-(carboxymethyl)hydroxylamine,	N-(5-carboxypentyl) hydroxylamine,
N-(2-carboxyethyl)hydroxylamine,	N-(6-carboxyhexyl)hydroxylamine,
N-(3-carboxypropyl)hydroxylamine,	N-(4-carboxybenzyl)hydroxylamine and
N-(4-carboxybutyl)hydroxylamine,	N-(12-carboxydodecyl)hydroxylamine.

15. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) ester.

16. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) ester and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from alkyl (C1 – C18) and aryl esters.

17. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl (C1-C18) or arylesters~~ and the hydroxylamine is selected from:

N-(acetyloxymethyl)hydroxylamine,
N-(acetyloxyethyl)hydroxylamine,
N-(acetyloxypropyl)hydroxylamine,
N-(propylcarbonyloxy)methylhydroxylamine,
N-(butylcarboxyloxy)methylhydroxylamine,
N-(tert-butyloxycarboxyl)methylhydroxylamine,
N-(benzyloxycarbonyl)methylhydroxylamine,
N-(phenyloxycarbonyl)methylhydroxylamine,
N-(3-pyridyloxycarbonyl)methylhydroxylamine and

N-(benzoxazol-5-carbonyloxy)methylhydroxylamine.

18. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) carbonyl.

19. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted carbonyl and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from alkyl (C1 – C18) carbonyls and aryl carbonyls.

20. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl (C1-C18) or aryl carbonyls~~ and the hydroxylamine is selected from:

N-(acetyl)methylhydroxylamine,	N-(phenylcarbonyl)methylhydroxylamine
N-(ethylcarbonyl)methylhydroxylamine,	and
N-(butylcarbonyl)methylhydroxylamine,	N-(benzylcarbonyl)methylhydroxylamine.

21. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl(C1-C18) or aryl amino.

22. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl (C1-C18) or aryl amino and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from primary alkyl amine selected from methylamine, ethylamine, propylamine, butylamine and hexylamine, secondary amine selected from dimethylamine, diethylamine and dipropylamine, tertiary amine selected from trimethyl and triethylamine, and quarternary amine selected from tetramethyl and tetra-ethylammonium salts.

23. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl(C1-C18) or aryl amine~~ and the hydroxylamine is selected from:

N-aminomethylhydroxylamine,
N-(2-aminoethyl)hydroxylamine,
N-(N-methylamino)methylhydroxylamine,
N-(N,N-dimethylamino)methylhydroxylamine,
N-(N,N,N-trimethylammonium)methylhydroxylamine,
N-(3-aminopropyl)hydroxylamine,
N-(6-aminoethyl)hydroxylamine,
N-(4-aminobenzyl)hydroxylamine,
Hydroxylamine -1-methylpyridinium and
Hydroxylamine-1-methylquinolinium.

24. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) alkyl or aryl nitro.

25. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl(C1-C18) or aryl nitro and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from alkyl nitro selected from nitromethyl, nitroethyl, nitropropyl, nitrobutyl, nitropentyl, nitrohexyl and nitrobenzyl, and aryl nitro selected from nitrophenyl and nitronaphthyl.

26. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted alkyl(C1-C18) or aryl nitro~~ and the hydroxylamine is selected from:

N-(nitromethyl)hydroxylamine,	N-(5-nitropentyl)hydroxylamine,
N-(2-nitroethyl)hydroxylamine,	N-(6-nitrohexyl)hydroxylamine,

N-(3-nitropropyl)hydroxylamine, N-(4-nitrobenzyl)hydroxylamine and
N-(4-nitrobutyl)hydroxylamine, N-(2,4-dinitrobenzyl)hydroxylamine.

27. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) nitroso.

28. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) nitroso and the R said at least one of R₁, R₂ and R₃ is selected from aliphatic nitrosoamines and aromatic nitroso.

29. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted nitroso (C1-C18)~~ and the hydroxylamine is selected from:

N-(N-methyl-N-nitroso-amino)methyl hydroxylamine,
N-(N-methyl-N-nitroso-2-amino)ethylhydroxylamine,
N-(N-methyl-N-nitroso-3-amino)propylhydroxylamine and
N-(p-nitroso)benzylhydroxylamine.

30. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted oxime.

31. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) oxime and the R said at least one of R₁, R₂ and R₃ is selected from: acetaldoxime, propionaldoxime, butanaldoxime and benzaldoxime.

32. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted oxime (C1-C18)~~ and the hydroxylamine is selected from:

Acetaldoxime-3-hydroxylamine, Propionaldoxime-4-hydroxylamine,	Butanaldoxime-5-hydroxylamine and (4-benzaldoxime)1-methylhydroxylamine.
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33. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-~~C10~~C18) hydrazone.

34. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-~~C10~~C18) hydrazone and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from: acetaldehyde hydrazone, propanaldehyde hydrozone, butanaldehyde hydrazone and phenylhydrazone.

35. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted hydrazone (C1-C10)~~ and the hydroxylamine is selected from

1-hydroxylamine-acetaldehyde hydrazone, 1-hydroxylamine-propanaldehyde hydrazone,	1-hydroxylamine-butanaldehyde hydrazone and 1-hydroxylamine-benzylaldehyde hydrazone.
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36. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted azo.

37. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted azo and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from: azobenzene, p-(phenylazo)benzyl and p-diazobenzyl.

38. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted azo~~ and the hydroxylamine is selected from:

N-(p-phenylazo)benzylhydroxylamine,
N-(p-diazobenzyl)hydroxylamine and
N-(p-methoxyphenylazo)benzylhydroxylamine.

39. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) thiol.

40. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) thiol and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from (C1-C18) alkylthiol selected from methyl, ethyl, propyl, butyl, pentyl and hexyl thiol, and arylthiol selected from thiophenol and benzylthiol.

41. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) thiol and~~ the hydroxylamine is selected from:

N-(thiomethyl)hydroxylamine,	N-(3-thiopropyl)hydroxylamine and
N-(2-thioethyl)hydroxylamine,	N-(p-sulphydryl)benzylhydroxylamine.

42. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) sulfonic acid.

43. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) sulfonic acid and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from methanesulfonic acid, ethanesulfonic acid, propanesulfonic acid, butanesulfonic acid and p-toluenesulfonic acid.

44. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) sulfonic acid and~~ the hydroxylamine is selected from:

1-hydroxylamine-methanesulfonic acid, 1-hydroxylamine-butane-4-sulfonic acid
1-hydroxylamine-ethane-2-sulfonic acid, and
1-hydroxylamine-propane-3-sulfonic acid, N-(p-sulfobenzyl)hydroxylamine.

45. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is halide.

46. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is halide and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from F, Cl, Br and I.

47. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is halide and~~ the hydroxylamine is selected from:

N-(chloromethyl)hydroxylamine, N-(4-chlorobutyl)hydroxylamine,
N-(bromomethyl)hydroxylamine, N-(p-chlorobenzyl)hydroxylamine,
N-(2-chloroethyl)hydroxylamine, N-(p-fluorobenzyl)hydroxylamine and
N-(3-chloropropyl)hydroxylamine, N-(p-iodobenzyl)hydroxylamine.

48. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted hydroxylamine.

49. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted hydroxylamine and R said at least one of R₁, R₂ and R₃ is selected from N-methylhydroxylamine, N-ethylhydroxylamine, N-propylhydroxylamine N-butylhydroxylamine, N-pentylhydroxylamine, and N-benzylhydroxylamine.

50. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted hydroxylamine and~~ the hydroxylamine is selected from:

Bis-methylhydroxylamine,
Bis-(2-ethyl)hydroxylamine,

Bis-(3-propyl)hydroxylamine and
Bis-benzylhydroxylamine.

51. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) phosphoester.

52. (Currently amended) A composition according to claim 1, wherein at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) phosphoester and ~~the R~~ said at least one of R₁, R₂ and R₃ is selected from: dimethylphosphate, diethylphosphate, dipropylphosphate and benzylphosphate.

53. (Currently amended) A composition according to claim 1, wherein ~~at least one R of R₁, R₂ and R₃ is substituted or unsubstituted (C1-C18) phosphoester and~~ the hydroxylamine is selected from:

di-hydroxylaminemethylphosphate ester,
mono-hydroxylaminemethylphosphate ester,
mono-(1-hydroxylamine)-ethyl-2-phosphate ester,
di-(1-hydroxylamine)-2-ethylphosphate ester,
di-(1-hydroxylamine)-3-propyl-phosphate ester,
mono-(hydroxylamine-benzyl-phosphate ester and
di-hydroxylamine-benzylphosphateester.

54. (Original) A composition according to claim 1, wherein the nitrone is less than 1% (wt/wt) of the hydroxylamine in the composition.

55. (Original) A composition according to claim 1 further comprising an effective amount of a carnitine.

56. (Original) A method for reducing oxidative damage to, or delaying senescence of a cell comprising the step of contacting a cell subject to or at risk of undesirable oxidative damage or senescence with a composition according to claim 1.

57. (Original) A method for reducing oxidative damage to, or delaying senescence of a cell comprising the steps of:

identifying a cell as subject to or at risk of undesirable oxidative damage or senescence;
and
contacting the cell with a composition according to claim 1.

58. (Original) A method according to claim 57, wherein the cell is contained in other than a cancerous host.